Wave Optics Terms Defined

Here are 30 important key terms in wave optics:

1. **Wavefront**: The locus of points having the same phase of vibration.
2. **Huygens' Principle**: Every point on a wavefront acts as a secondary source of wavelets.
3. **Interference**: The phenomenon where two or more waves superimpose to form a resultant wave.
4. **Constructive Interference**: When two waves combine to produce a wave with greater amplitude.
5. **Destructive Interference**: When two waves combine to produce a wave with reduced or zero amplitude.
6. **Diffraction**: The bending of light waves around obstacles or through slits.
7. **Young's Double-Slit Experiment**: Demonstration of light's wave nature using interference patterns.
8. **Coherence**: The property of wave sources to produce waves in constant phase relation.
9. **Monochromatic Light**: Light consisting of a single wavelength or color.
10. **Fringe Pattern**: The alternating light and dark bands seen in interference.
11. **Path Difference**: The difference in the distances traveled by two light waves reaching a point.
12. **Phase Difference**: The difference in phase between two waves at a point.
13. **Polarization**: Restriction of the vibrations of transverse waves (like light) to one direction.
14. **Brewster's Angle**: The angle at which light is perfectly polarized when reflected.
15. **Malus's Law**: Describes the intensity of polarized light passing through a polarizer.
16. **Diffraction Grating**: An optical component with closely spaced lines that disperses light into a spectrum.
17. **Single-Slit Diffraction**: The diffraction pattern produced by light passing through a single slit.
18. **Fresnel Diffraction**: Diffraction pattern observed when the source or the screen is close to the aperture.
19. **Fraunhofer Diffraction**: Diffraction pattern observed when both the source and the screen are far from the aperture.
20. **Resolving Power**: The ability of an optical instrument to distinguish two close objects as separate.
21. **Rayleigh Criterion**: A criterion used to define the resolving power of an optical system.
22. **Thin Film Interference**: Interference caused by light waves reflecting off the two surfaces of a thin film.
23. **Newton's Rings**: A pattern of concentric circles formed by the interference of light reflecting from a lens and a flat surface.
24. **Fresnel Biprism**: A device used to produce two coherent sources for interference experiments.
25. **Optical Path Length**: The product of the refractive index and the geometrical length of the path traveled by light.
26. **Refractive Index**: A measure of how much light slows down in a medium.
27. **Phase Velocity**: The rate at which the phase of the wave propagates in space.
28. **Group Velocity**: The velocity at which the overall envelope of the wave group travels.
29. **Airy Disk**: The diffraction pattern produced by a circular aperture, with a bright central spot and rings.

30. **Michelson Interferometer**: An optical instrument used to measure the interference pattern created by splitting a beam of light.

These terms cover key concepts and instruments associated with wave optics, explaining how light behaves as a wave in various contexts.